Math
Grade 3

PLD	Standard	Minimally Proficient	Partially Proficient	Proficient	Highly Proficient
		The Minimally Proficient student	The Partially Proficient student	The Proficient student	The Highly Proficient student
Operations and Algebraic Thinking					
Detailed	3.OA.A [1 to 4]	Interprets whole number products and quotients with visual support. Multiplies and divides within 100 to solve word problems involving equal groups and arrays when a visual model is given. Determines the unknown whole number in a multiplication or division equation, when the unknown number is the product or quotient. Factors and divisors are less than or equal to 5 for all problems.	Interprets whole number products and quotients with visual support. Multiplies and divides within 100 to solve word problems involving equal groups and arrays when a visual model is given. Determines the unknown whole number in a multiplication or division equation, when the unknown number is the product or quotient. Factors and divisors are less than or equal to 9 for all problems.	Interprets products and quotients of single-digit whole numbers using equal groups of objects, arrays of objects and comparison. Multiplies and divides within 100 to solve single-step word problems involving equal groups, arrays, and measurement quantities. Determines an unknown whole number, in any position, in a multiplication and division equation.	Interprets products and quotients of whole numbers within 100, representing context using pictures, numbers, and words. Multiplies and divides within 100 to solve multi-step word problems involving equal groups, arrays, and measurement quantities. Determines an unknown whole number in a multiplication and division equation. Students will use the given context to generate an equation or create a word problem.
Detailed	3.OA.B [5 to 6]	Applies the properties of operations to multiply and divide. Solves division as unknown factor problems by	Applies the properties of operations to multiply and divide. Solves division as unknown factor problems by	Applies the properties of operations as strategies to multiply and divide. Determines an appropriate strategy for	Applies multiple strategies of operations within a word problem. Solves division as unknown factor

		finding missing number in the second factor position with visual support. Factors and divisors are less than or equal to 5 for all problems.	finding missing number in any position with visual support. Factors and divisors are less than or equal to 9 for all problems.	a given situation. Understands that division can be expressed as an unknown factor problem by using the relationship between multiplication and division.	problems by using the relationship between multiplication and division, models multiplication and division in a variety of ways.
Detailed	3.OA.C [7]	Multiplies and divides single-digit numbers using a variety of strategies and supports.	Fluently multiplies and divides all single-digit numbers using variety strategies.	Knows from memory all products of two single-digit numbers, fluently multiplies products within 100, fluently divides dividends that are less than 100.	Fluently multiplies and divides within 100 using a wide range of contexts.
Detailed	3.OA.D [8 to 9]	Solve two-step word problems using addition and subtraction with simple context and concrete objects or visual representations. Identifies additive arithmetic patterns using visual supports, such as an addition table.	Solve two-step word problems using the four operations with simple context and visual representations (with the unknown in a variety of positions). Identifies multiplicative and subtractive arithmetic patterns using visual supports.	Solve two-step word problems using equations in the four operations (using a letter standing for the unknown quantity). Recognizes the reasonableness of answers using mental computation and estimation strategies. Identifies arithmetic patterns and explains them using properties of operations.	Creates two-step word problems using multiple operations. Creates and extends arithmetic patterns, explains patterns using properties of operations.

Math
Grade 3

Number and Operations in Base Ten					
Detailed	3.NBT.A [1 to 3]	Uses place value understanding to round a two-digit number to the nearest 10. Adds and subtracts two digit numbers using visual models or support. Skip counts by 10, 20 or 50 to multiply single-digit whole numbers by multiples of 10 in the range 10-90.	Uses place value understanding to round a three-digit number to the nearest 100. Adds and subtracts numbers within 1,000 using visual models or support. Uses grouping strategies (associative property) to multiply single-digit whole numbers by multiples of 10 in the range 10-90.	Uses place value understanding to round whole numbers (up to 1,000) to the nearest 10 or 100. Fluently adds and subtracts within 1,000 using any strategy. Multiplies single-digit whole numbers by multiples of 10 in the range 10-90 using any of a variety of strategies.	Uses rounding strategies in real-world situations. Explains the method used in finding the sum or difference; recognizes and identifies an error and shows the correct answer. Shows product of single-digit whole numbers by multiples of 10 using multiple strategies.

Math
Grade 3

Number and Operations - Fractions					
Detailed	3.NF.A [1 to 2b]	Identifies the numerator and denominator of a fraction or a fraction on a number line where the increments are equal to the denominator.	Identifies the meaning of the numerator and denominator of a fraction. Represents a fraction on a partitioned number line.	Understands 1/b is equal to one part when the whole is partitioned into b equal parts (where the denominators are 2, 3, 4, 6 or 8). Represents a fraction on a number line by partitioning into equal parts.	Applies understanding of unit fractions to real world situations and problems. Represents a set of fractions with unlike denominators on a number line by partitioning into equal parts.
Detailed	3.NF.A [3a to 3d]	Understands, recognizes, and generates equivalent fractions using denominators of 2, 4 and 8 given visual models. Expresses and recognizes fractions that are equivalent to 1. Compares two fractions with the same denominator and records results using symbols.	Understands, recognizes, and generates equivalent fractions using denominators of 2, 4 and 8. Expresses and recognizes fractions that are equivalent to whole numbers. Compares two fractions with the same numerator and records results using symbols.	Understand, recognizes, and generates equivalent fractions using denominators of 2, 3, 4, 6, and 8; explains why the fractions are equivalent using a visual model. Expresses whole numbers as fractions. Compares two fractions that have the same numerator or same denominator using symbols and visual fraction models.	Explains why two fractions are equivalent. Identifies equivalent fractions by creating fraction models to compare fractions with different denominators that pertain to the same whole. Compares two fractions that have the same numerator or same denominator using symbols.

Math
Grade 3

Measurement and Data					
Detailed	3.MD.A [1 to 2]	Tells, writes, and measures time to the nearest minute. Using grams, kilograms or liters, measures and estimates liquid volumes and masses of objects using models.	Solves one-step word problems involving addition or subtraction of time intervals in minutes with scaffolding. Using grams, kilograms or liters, solves simple one-step measurement word problems using either addition or subtraction.	Solves one-step word problems involving addition and subtraction of time intervals in minutes. Using grams, kilograms or liters, estimates and solves one-step measurement word problems involving any of the four operations.	Solves two-step real world problems involving addition and subtraction of time intervals in minutes. Using grams, kilograms or liters, estimates and solves two-step measurement word problems involving any of the four operations.
Detailed	3.MD.B [3 to 4]	Completes a scaled picture graph or bar graph (with a scale factor of 1 or 5) to represent data set with support. Generates measurement data by measuring lengths to the nearest half-inch. Shows the data by making a line plot, where the horizontal scale is marked by whole numbers or halves with supports.	Completes a scaled picture graph or bar graph to represent a data set with support. Solves one-step "how many more" and "how many less" problems using information presented in scaled bar graphs. Generates measurement data by measuring lengths to the nearest quarter-inch. Shows the data by making a line plot, where the horizontal scale is marked by whole numbers, halves, or quarters with supports.	Creates a scaled picture graph or bar graph to represent a data set. Solves two-step "how many more" and how many less" problems using information presented in scaled bar graphs. Shows the data by making a line plot, where the horizontal scale is marked by whole numbers, halves or quarters.	Solves multi-step "how many more" and how many less" problems using information presented in scaled bar graphs. Uses a line plot to answer questions or solve problems.

Math
Grade 3

Detailed	3.MD.C [5a to 7d]	Understands what a square unit is and that a plane figure can be covered without gaps or overlaps to find an area. Finds the area of one or two rectangles by tiling.	Understands area is measured using square units, finds area of a rectangle by counting the square units. Shows that the area of a rectangle find by tiling is the same as would be found by multiplying the side lengths. Finds the area of two rectangles by tiling and adds the areas of the rectangles.	Understands area is measured using square units, finds area of a plane figure by counting the square units or multiplying the side lengths, in the context of solving real-world and mathematical problems. Represents whole number products as rectangular areas.	Finds the area of 2 plane figures by counting the square units or multiplying their side lengths and compares their sizes. Creates a word problem using the distributive property to find the area of rectangles.
Detailed	3.MD.D [8]	Finds the perimeter and area of polygons (given the side lengths).	Solves mathematical problems involving perimeters of polygons, including finding the perimeter and area (given the side lengths); compares and contrasts area and perimeter.	Solves real-word and mathematical problems involving perimeters of polygons, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.	Constructs rectangles that have the same perimeter but different areas and the reverse.

Math
Grade 3

Geometry					
Detailed	3.G.A [1 to 2]	Identifies examples of quadrilaterals; recognizes that examples of quadrilaterals have shared attributes, and that the shared attributes can define a larger category. Partitions shapes into parts with equal areas and expresses the area as a unit fraction of the whole (limited to halves and quarters).	Understands the properties of quadrilaterals and the subcategories of quadrilaterals. Partitions shapes into parts with equal areas and expresses the area as a unit fraction of the whole (limited to halves, quarters, and eighths).	Recognizes and sorts examples of quadrilaterals that have shared attributes and that the shared attributes can define a larger category; draws examples of quadrilaterals that don't belong to the categories of rhombuses, rectangles, and squares. Partitions shapes into parts with equal areas and expresses the area as a unit fraction (with denominator of 2, 3, 4, 6, or 8) of the whole.	Recognizes and sorts examples of quadrilaterals that have shared attributes and that the shared attributes can define a larger category; draws examples and non-examples of quadrilaterals that are not rhombuses, rectangles, or squares. Partitions shapes in multiple ways into parts with equal areas and expresses the area as a unit fraction of the whole.

Math
Grade 4

PLD	Standard	Minimally Proficient	Partially Proficient	Proficient	Highly Proficient
		The Minimally Proficient student	The Partially Proficient student	The Proficient student	The Highly Proficient student
Operations and Algebraic Thinking					
Detailed	4.OA.A [1 to 3.1]	Recognizes that any two factors and their product can be read as a comparison. Solves word problems involving multiplicative comparison (where the unknown is the product or quotient), given visual representations. Solves multi-step word problems using the four operations with simple context and scaffolding, where the final answer is the unknown. Solves a counting problem with two attributes using a visual representation.	Represents comparisons of two factors and their product as equations using supports. Solve word problems involving multiplicative comparison (where the unknown is in a variety of positions), given visual representations. Solves multi-step word problems (which may include interpreting remainders) using the four operations with simple context and scaffolding, where the final answer is the unknown. Creates and uses any visual representation of a counting problem with two attributes.	Represents comparisons of two factors and their product as equations without support. Solves word problems involving multiplicative comparison, where the unknown is in a variety of positions. Solves multi-step word problems (including interpreting remainders) using the four operations. The unknown is in a variety of positions and can be represented by a symbol or letter. Recognizes the reasonableness of answers using mental computation and estimation strategies. Creates and uses any representation of counting problems; analyzes simple	Recognizes that any two factors and their product can be read as a comparison; uses multiple strategies and creates his or her own to represent and describe those comparisons. Creates own context for multiplicative comparison. Solves complex multi-step word problems with multiple possible solutions and determines which would be the most reasonable based upon given criteria. Analyzes relationships between any two representations of a counting problem and makes connections to the multiplication principle.

				relationships between counting problem representations.	
Detailed	4.OA.B [4]	Finds factor pairs for a multiple of 10. Determines whether a whole number in the range of 1 to 25 is prime or composite, given visual representations.	Finds factor pairs for any whole number. Determines whether a whole number in the range of 1 to 50 is prime or composite, given visual representations.	Recognizes that a whole number is a multiple of each of its factors and determines a given whole number in the range of 1 to 100 is a multiple of a given single-digit number. Determines whether a whole number in the range of 1 to 100 is prime or composite.	Applies the concepts of both factors and prime and composite numbers in problem-solving contexts.
Detailed	4.OA.C [5]	Generates a number or shape pattern that follows a given rule, using visual models.	Generates a number or shape pattern that follows a given rule.	Generates a number or shape pattern that follows a given rule; identifies apparent features that are not explicit in the rule.	Generates a number or shape pattern that combines two operations for a given rule.

Math
Grade 4

Number and Operations in Base Ten					
Detailed	4.NBT.A [1 to 3]	With numbers within 10,000, recognizes that a digit in one place represents 10 times as much as it represents in the place to its right, reads and writes multi-digit whole numbers in a variety of forms, and uses place value understanding to round multi-digit whole numbers.	With numbers within 100,000, recognizes that a digit in one place represents 10 times as much as it represents in the place to its right, reads and writes multi-digit whole numbers in a variety of forms, and uses place value understanding to round multi-digit whole numbers.	With numbers within 1,000,000, recognizes that a digit in one place represents 10 times as much as it represents in the place to its right, reads and writes multi-digit whole numbers in a variety of forms, and uses place value understanding to round multi-digit whole numbers.	Uses place value strategies, comparisons of two numbers, and rounding in a real-world context.
Detailed	4.NBT.B [4 to 6]	Fluently adds and subtracts multi-digit whole numbers using the standard algorithm without regrouping. Finds products of a whole number (of up to three digits) by a single-digit whole number and whole number quotients and remainders (with up to double-digit dividends and single-digit divisors).	Fluently adds and subtracts multi-digit whole numbers using the standard algorithm with supports. Finds products of a whole number (of up to four digits) by a single-digit whole number and whole number quotients and remainders (with up to three-digit dividends and single-digit divisors).	Fluently adds and subtracts multi-digit whole numbers using the standard algorithm. Finds products of a whole number (of up to four digits) by a single-digit whole number or two double-digit numbers and whole number quotients and remainders (with up to four-digit dividends and single-digit divisors) in context. Illustrates and explains calculations by using equations, rectangular arrays, and/or area models.	Recognizes and identifies an error in an addition or subtraction and shows the correct answer. Interprets a multiplication or division context and explains strategies used to solve. Fluently adds and subtracts multidigit whole numbers using the standard algorithm.

Math
Grade 4

Number and Operations - Fractions					
Detailed	4.NF.A [1 to 2]	Uses area fraction models to represent equivalent fractions by partitioning unit fraction pieces into smaller equal pieces. Uses a visual fraction model to compare two fractions with different numerators and different denominators.	Uses area fraction models to represent equivalent fractions by partitioning unit fraction pieces into smaller pieces (and understands that this is the same), and multiplies by 1 represented as a fraction.	Uses area fraction models and double number lines to generate and explain why fraction a/b is equivalent to a fraction (n x a)/(n x b), where n is a non-negative whole number. Compares two fractions with different numerators and different denominators and justifies answers using visual fraction models.	Uses a variety of strategies to generate and explain why fraction a/b is equivalent to a fraction (n x a)/(n x b), where n is a non-negative whole number. Extends understanding to compare and order fractions with different numerators and different denominators.
Detailed	4.NF.B [3]	Adds and subtracts fractions with like denominators by joining and separating parts referring to the same whole with or without context using visual or manipulative models, with no or a simple context. Converts mixed numbers to equivalent fractions.	Adds and subtracts fractions with like denominators by joining and separating parts referring to the same whole using visual or manipulative models, with no or a simple context. Decomposes a fraction into a sum of fractions with the same denominator and records the decomposition using an equation. Converts mixed numbers into equivalent fractions and adds and subtracts	Adds and subtracts fractions with like denominators by joining and separating parts referring to the same whole, with or without context. Decomposes a fraction into a sum of fractions with the same denominator in more than one way and records the decomposition using an equation.	Adds and subtracts more than 2 fractions with like denominators by joining and separating parts referring to the same whole, with or without context. Decomposes a fraction into a sum of fractions with the same denominator in multiple ways and records the decomposition using an equation.

			them.		
Detailed	4.NF.B [4]	Understands a fraction a/b as a multiple of 1/b by using visual fraction models.	Understands a fraction a/b as a multiple of 1/b, and uses this understanding to multiply a fraction by a whole number, using visual fraction model.	Understands and solves simple word problems by recognizing that fraction a/b is a multiple of 1/b, and uses that construct to multiply a fraction by a whole number (in general, n x a/b is (n x a)/b).	Understands and solves more complex word problems by recognizing that fraction a/b is a multiple of 1/b, and uses that construct to multiply a fraction by a whole number (in general, n x a/b is (n x a)/b).
Detailed	4.NF.C [5 to 7]	Expresses a fraction with denominator 10 as an equivalent fraction with denominator 100 by using a model. Uses decimal notation for fractions with a denominator of 10, with supports. Compares two decimals with the same number of places (tenths or hundredths) using supports.	Adds two fractions with respective denominators 10 and 100 by first finding equivalent fractions with like denominators by using a model. Uses decimal notation for fractions with denominators of 10 or 100, with supports. Compares two decimals to the hundredth by reasoning about their size using models.	Adds two fractions with respective denominators 10 and 100 by first finding equivalent fractions with like denominators. Uses decimal notation for fractions with denominators of 10 or 100. Compares two decimals in the tenths and the hundredths (using <, >, and =) by reasoning about their size and records the result of the comparison using the correct symbols.	Solves missing addend problems with respective denominators 10 and 100 by first finding equivalent fractions with like denominators. Demonstrates knowledge of decimal notation for fractions with denominators of 10 or 100 by converting a number with decimal notation to a decimal fraction. Orders decimal set composed of tenths and hundredths by reasoning about their size. Recognizes that the decimals must refer to the same whole.

Math
Grade 4

Measurement and Data					
Detailed	4.MD.A [1 to 3]	Knows relative size of measurement units, within one system of units. Uses the four operations to solve word problems (involving distance, liquid volumes, masses of objects, intervals of time and money), including problems involving whole numbers, using supports. Applies the area and perimeter formulas when given all side measurements, using supports.	Expresses measurements in a larger unit in terms of a smaller unit, within a single system, using supports and adjacent units. Uses the four operations to solve word problems (involving distance, liquid volumes, masses of objects, intervals of time and money, area, and perimeter), including problems involving simple fractions or decimals, using supports.	Expresses measurements in a larger unit in terms of a variety of smaller units, within a single system, and records that data in a two-column table. Uses the four operations to solve word problems (involving distance, liquid volumes, masses of objects, intervals of time and money), including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represents measurement quantities using diagrams. Applies the area and perimeter formulas for rectangles in real-world and mathematical problems, including those where the area/perimeter and one factor (length or width) are known.	Given a context, determines the appropriate unit needed and expresses the measurement to the level of accuracy needed. Uses the four operations to solve multi-step word problems (involving distance, liquid volumes, masses of objects, intervals of time and money), including problems involving fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represents measurement quantities using diagrams. Applies the area and perimeter formulas for rectilinear shapes in real-world and mathematical problems.
Detailed	4.MD.B [4]	Makes a line plot to	Makes a line plot to	Makes a line plot to	Uses data in a line plot

		display a data set of measurements in fractions of a unit (with like denominators of 2 or 4).	display a data set of measurements in fractions of a unit (with like denominators of 2 or 4), and uses addition and subtraction of fractions to solve problems involving information in the line plot.	display a data set of measurements in fractions of a unit (with like denominators limited to 2, 4 and 8), and uses addition and subtraction of fractions to solve problems involving information in the line plot.	to solve a multi-step word problem.
Detailed	4.MD.C [5 to 7]	Measures benchmark angles. Recognizes that angle measure is additive. Solves addition real-world mathematical problems to find unknown angles on a diagram with no more than two angles, within a 90-degree angle.	Understands that angles are measured in reference to a circle, and can measure angles in whole number degrees using a protractor. Solves addition and subtraction real-world mathematical problems to find unknown angles on a diagram with no more than two angles, within a 180-degree angle.	Understands that angles are measured in reference to a circle, and can measure angles in whole number degrees using a protractor. Sketches angles of specific measure. Solves addition and subtraction real-world mathematical problems to find unknown angles on a diagram.	Recognizes how angles are formed, understands that angles are measured in reference to a circle, and can measure angles in whole number degrees using a protractor. Sketches angles of specific measure. Given angle parameters, decomposes into multiple angles and gives the measure of each angle in relationship to the whole.

Math
Grade 4

Geometry					
Detailed	4.G.A [1 to 3]	Identifies points, lines, line segments, rays, perpendicular and parallel lines, two-dimensional figures, including right triangles, and line-symmetric regular figures; classifies angles (right, acute, obtuse).	Identifies and draws points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Classifies two-dimensional figures based on the presence or absence of parallel or perpendicular lines; identifies triangles. Draws lines of symmetry for regular two-dimensional figures.	Draws points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines; identifies these in two-dimensional figures. Classifies two-dimensional figures based on the presence or absence of angles of specified size. Draws lines of symmetry for any two-dimensional figure.	Creates a two-dimensional shape when given specific attributes, including the presence or absence of parallel or perpendicular lines, the presence or absence of angles of specified size, and particular lines of symmetry.

Math
Grade 5

PLD	Standard	Minimally Proficient	Partially Proficient	Proficient	Highly Proficient
		The Minimally Proficient student	The Partially Proficient student	The Proficient student	The Highly Proficient student
Operations and Algebraic Thinking					
Detailed	5.OA.A [1 to 2]	Evaluates a simple numerical expression using parentheses, brackets, or braces (without nesting). Writes a numerical expression, using one operation, from a written statement.	Evaluates a numerical expression using parentheses, brackets, or braces (without nesting). Writes simple numerical expressions and interprets numerical expressions, without evaluating them.	Uses parentheses, brackets, or braces in numerical expressions (without nesting), and evaluates expressions with these symbols. Writes numerical expressions and interprets numerical expressions, without evaluating them.	Inserts parentheses, brackets, or braces (without nesting), in numerical expressions to make a statement true. Writes numerical expressions using multiple operations, involving real-world and mathematical contexts.
Detailed	5.OA.B [3]	Continues two numerical patterns (when given a table), using two given rules.	Continues two numerical patterns using two given rules.	Generates two numerical patterns using two given rules. Identifies apparent relationships between corresponding terms.	Generates two numerical patterns using two multi-step given rules, in mathematical contexts. Explains the relationship between corresponding terms.

Number and Operations in Base Ten					
Detailed	5.NBT.A [1 to 2]	Uses visual models or calculation to demonstrate a digit in one place of a whole number represents 10 times as much as it represents in the place to its right, or 1/10 of what it represents in the place to its left. Continues a given pattern that shows the number of zeroes of the product when multiplying a number by powers of 10.	Uses visual models or calculation to recognize that a digit in one place in a whole number represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left. Recognizes patterns in the number of zeroes of products when multiplying a number by powers of 10. Uses whole number exponents greater than zero to denote powers of 10.	Recognizes (in any multi-digit number, including decimals to thousandths) that a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left. Explains patterns in the number of zeroes of the product when multiplying a number by powers of 10, and explains patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Uses whole number exponents to denote powers of 10, including 10 to the power of zero.	Recognizes (in any multi-digit number, including decimals to thousandths) that a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left, in real-world or mathematical context problems. Interprets a multiplication problem to identify the factor of 10 by which one number is greater or lesser than another.
Detailed	5.NBT.A [3 to 4]	Reads decimals to the thousandths place. Compares two decimals to the tenths place, using >, =, and < symbols to record the results of comparisons. Uses place value understanding to round	Reads and writes decimals to the thousandths place, using base-ten numerals and number names. Compares two decimals to the hundredths place, using >, =, and < symbols to	Reads and writes decimals to the thousandths place, using base-ten numerals, number names, and expanded form (e.g., 347.392 = 3 X 100 + 4 X 10 + 7 X 1 + 3 X (1/10) + 9 X	Writes numbers in expanded form in a variety of formats (e.g., 347.392 = 7 X 1 + 3.4 X 100 + 3 X (1/10) + 2 X (1/1000) + (1/100) X 9). Compares and orders decimals to the thousandths place (with

		multi-digit numbers to the tenths place.	record the results of comparisons. Uses place value understanding to round multi-digit whole numbers to the hundredths place.	(1/100) + 2 X (1/1000). Compares two decimals to the thousandths place (with varying place values), using >, =, and < symbols to record the results of comparisons. Uses place value understanding to round multi-digit numbers up to any place (within content limits).	varying place values), from least to greatest or vice-versa. Uses rounding strategies in real-world situations.
Detailed	5.NBT.B [5 to 6]	Multiplies two two-digit numbers using a standard algorithm. Finds whole-number quotients of whole numbers (with up to two digit dividends and two-digit divisors), using rectangular arrays or area models.	Multiplies three-digit by two-digit whole numbers, using a standard algorithm. Finds whole-number quotients of whole numbers (with up to three digit dividends and two-digit divisors), using strategies based on place value and the properties of operations.	Fluently multiplies multi-digit whole numbers using a standard algorithm. Finds whole-number quotients of whole numbers (with up to four digit dividends and two-digit divisors), using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrates and explains the calculation by using equations, rectangular arrays, and/or area models.	Fluently multiplies multi-digit whole numbers, in real-world and mathematical contexts, using a standard algorithm. Finds whole-number quotients of whole numbers (with up to four digit dividends and two-digit divisors) in context.
Detailed	5.NBT.B [7]	Adds, subtracts, multiplies, and divides	Adds, subtracts, multiplies, and divides	Adds, subtracts, multiplies, and divides	Adds, subtracts, multiplies, and divides

		decimals to the tenths place, using concrete models, drawings, or strategies based on place value.	decimals to the hundredths place, using concrete models or drawings, strategies based on place value, and/or the relationship between addition and subtraction; relates the strategy to a written method.	decimals to the hundredths place, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relates the strategy to a written method and explains the reasoning used.	decimals to the hundredths place, using multiple strategies, in a real-world or mathematical context; relates the strategy to a written method and explains the reasoning used.

Number and Operations - Fractions					
Detailed	5.NF.A [1 to 2]	Adds/subtracts fractions with unlike denominators, where one denominator is a multiple of the other denominator, with the use of a visual model. Solves word problems involving addition and subtraction of fractions with unlike denominators, where one denominator is a multiple of the other denominator, using visual representations. Determines a common denominator, with use of a visual model.	Adds/subtracts fractions with unlike denominators, where one denominator is a multiple of the other denominator. Solves word problems involving addition and subtraction of fractions with unlike denominators, where one denominator is a multiple of the other denominator.	Adds and subtracts fractions with unlike denominators (including mixed numbers). Solves word problems involving addition and subtraction of fractions with unlike denominators (including mixed numbers). Assesses and justifies reasonableness of the answer by using benchmark fractions, visual models, or equations.	Adds or subtracts at least 3 or more fractions with unlike denominators (including mixed numbers). Solves word problems involving addition or subtraction with at least 3 or more fractions with unlike denominators (including mixed numbers).
Detailed	5.NF.B [3]	Rewrites a fraction as a division problem; uses manipulatives or visual models to solve problems involving division of whole numbers, leading to answers in the form of fractions or mixed numbers.	Solves word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers.	Interprets a fraction as division of the numerator by the denominator (a/b = a ÷ b); solves word problems involving division of whole numbers, leading to answers in the form of fractions or mixed numbers.	Creates his or her own model to demonstrate division of fractions.
Detailed	5.NF.B [4 to 5]	Shows the product of a fraction by a whole	Shows the product of two fractions by using	Shows the product of two fractions using an	Creates a real-world context and models

		number by repeated addition, using visual fraction models. Interprets multiplication scaling by comparing the size of a product to the size of one factor on the basis of the size of the second factor, without performing the indicated multiplication (where both factors are whole numbers).	an area model. Interprets multiplication scaling by comparing the size of a product to the size of one factor on the basis of the size of the second factor, without performing the indicated multiplication (where one factor is a fraction less than one).	area model and creates a story context for the product. Finds the area of a rectangle with fractional side lengths by tiling it with squares with unit fraction side lengths, and shows that the area is the same as would be found by multiplying the side lengths. Multiplies fractional side lengths to find areas of rectangles, and represents fraction products as rectangular areas. Interprets multiplication scaling by comparing the size of a product to the size of one factor on the basis of the size of the second factor, without performing the indicated multiplication.	representing multiplication of fractions. Demonstrates reasoning about fractions in both an additive and multiplicative sense with different wholes, and displays the quantities with visual models. Interprets multiplication scaling by comparing the size of a product to the size of one factor on the basis of the size of the second factor by performing the indicated multiplication with 2 fractions.
Detailed	5.NF.B [6 to 7]	Solves real-world problems involving multiplication of fractions (limited to fractions with single-digit numerators or denominators) or division of whole numbers by unit fractions by using visual	Solves real-world problems involving multiplication of fractions or division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions (limited to single digit whole	Solves real-world problems involving multiplication of fractions and mixed numbers or division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, using visual	Uses several mixed numbers, often with multi-digit numerators or denominators, to solve real-world problems involving multiplication of fraction or mixed numbers. Creates real-world problems involving division of unit

		fraction models or equations to represent the problem.	numbers and denominators)by using visual fraction models or equations to represent the problem.	fraction models and equations to represent the problem.	fractions by non-zero whole numbers and division of whole numbers by unit fractions, using visual fraction models and equations to represent the problem.

Measurement and Data					
Detailed	5.MD.A [1]	Converts among different-sized standard measurement units within a given measurement system.	Converts among different-sized standard measurement units within a given measurement system; uses these conversions to solve single-step problems, using manipulatives or visual models.	Converts among different-sized standard measurement units within a given measurement system; uses these conversions in solving multi-step, real-world problems.	Creates real-world multi-step problems. Chooses the appropriate measurement unit based on the given context.
Detailed	5.MD.B [2]	Plots data on a given line plot with a data set of measurements in fractions of a unit (1/2, 1/4, 1/8), where the given data set is limited to a common denominator. Solves addition and subtraction comparison problems using the data.	Makes a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, or 1/8), where the given data set is limited to a common denominator. Solves problems using all four operations.	Makes a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Uses operations on fractions to solve problems involving information presented in line plots (division is limited to a whole number divided by a fraction or a fraction divided by a whole number).	Makes a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solves multi-step word problems using the four operations and interprets the solution to the data.
Detailed	5.MD.C [3 to 5]	Uses unit cubes to find the volume of rectangular prisms with whole number edges (limited to single digit dimensions). Solves volume problems of a right rectangular prism	Uses unit cubes (number of unit cubes, edge length, height) to find the volume of rectangular prisms. Uses the information that the number of unit cubes is related to the	Uses unit cubes (number of unit cubes, edge length, height) to find the volume of rectangular prisms. Represents the volume of a solid figure as n cubic units. Solves real-	Compares the volumes of different prisms by using unit cubes. Creates real-world mathematical problems that would be solved by finding volume.

		by using unit cubes.	edge length; uses visual models. Solves volume problems by relating the number of unit cubes in a prism to the multiplication of the edge lengths.	world and mathematical problems by applying the formulas for volume. Finds the volume of two non-overlapping right rectangular prisms by adding the volumes of the two non-overlapping parts.	

Geometry					
Detailed	5.G.A [1 to 2]	Identifies the key components of the coordinate plane (x-axis, x-coordinate, y-axis, y-coordinate and origin). Locates given points in the first quadrant of the coordinate plane.	Interprets coordinate values of points in the first quadrant (e.g., reading line graphs), in context.	Represents real-world and mathematical problems by locating and graphing points in the first quadrant of the coordinate plane.	Using real-world data, creates a representation and draws conclusions based on the data presented.
Detailed	5.G.B [3 to 4]	Identifies two-dimensional figures based on properties limited to sides and angles.	Classifies some two-dimensional figures into categories based on their properties (sides and angles).	Understands that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category and classifies two-dimensional figures in the hierarchy based on these properties.	Draws or constructs specific two-dimensional figures according to the definitions provided, attributes described, or categories given.

Math
Grade 6

PLD	Standard	Minimally Proficient	Partially Proficient	Proficient	Highly Proficient
		The Minimally Proficient student	The Partially Proficient student	The Proficient student	The Highly Proficient student
Ratios and Proportional Relationships					
Detailed	6.RP.A [1 to 2]	Identifies unit rates and describes them using basic language or notation.	Describes the concept of ratio using a limited variety of representations and determines a unit rate.	Uses the concept of a ratio, ratio language, ratio notation, and unit rate associated with a ratio to precisely describe a ratio relationship between two quantities and within context.	Uses and connects between representation for ratio situations and finds unit rates requiring multiple steps.
Detailed	6.RP.A.3 [a to d]	Identifies proportional relationships presented in graphical, tabular, or verbal formats, knows the meaning of a percent of a quantity as a rate per hundred, and finds missing values in tables and plots values on the coordinate plane using whole numbers.	Uses a limited variety of representations to solve ratio and unit rate problems involving whole numbers and to convert measurement units, finds the percent of a quantity, and manipulates units appropriately when multiplying or dividing quantities.	Uses ratio and rate reasoning to convert measurement units and solve real-world problems, solves unit rate problems including those involving unit pricing and constant speed, determines the percent of a quantity as a rate per 100, and solves problems involving finding the whole given a part and a percent.	Creates and applies ratio reasoning to solve real-world problems including those involving percent or conversion of measurement units.

The Number System					
Detailed	6.NS.A [1]	Solves problems in contexts involving division of whole numbers by unit fractions using visual fraction models and equations.	Solves problems in contexts involving division of fractions by non-zero whole numbers and vice versa using visual fraction models and equations.	Solves problems in contexts involving division of fractions by fractions and interprets the solution in context.	Solves problems in contexts involving multi-step division problems involving mixed numbers and interprets the solution in context.
Detailed	6.NS.B [2 to 3]	Adds, subtracts, multiplies where decimals are limited to hundredths, and finds whole number quotients and remainders where dividends are up to four digits and divisors are one digit using strategies based on place value, the properties of operations, and the relationship between operations.	Adds, subtracts, multiplies where dividends are limited to whole numbers, and finds whole number quotients and remainders where dividends are up to four digits and divisors are up to two digits using strategies based on place value, the properties of operations, and the relationship between operations.	Fluently adds, subtracts, multiplies and divides multi-digit numbers including multi-digit decimals using the standard algorithm for each operation.	Solves real world problems by adding, subtracting, multiplying and dividing multi-digit numbers including multi-digit decimals using the standard algorithm for each operation and assesses the reasonableness of the result.
Detailed	6.NS.B [4]	Finds common factors of two whole numbers less than or equal to 50 and common multiples of two whole numbers less than or equal to 10 using strategies including a visual model.	For two whole numbers, finds the greatest common factor less than or equal to 50 and the least common multiple less than or equal to 10.	For two whole numbers, finds the greatest common factor less than or equal to 100 and the least common multiple less than or equal to 12 and uses the distributive property to express a sum of two whole numbers from 1	Interprets a context to construct an equivalent expression using the greatest common factor, least common multiple, and the distributive property.

				to 100 with a common factor as a multiple of a sum of two whole numbers with no common factor.	
Detailed	6.NS.C [5 to 9]	Plots integer pairs on a coordinate plane and on a horizontal number line, compares two numbers on a number line, finds the absolute value of a rational number, and determines the distance between two points on the coordinate plane by counting spaces.	Plots rational pairs on a coordinate plane and on a horizontal or vertical number line, determines the meaning of zero in context, compares two numbers including absolute values, and determines the distance between two points with the same first or second coordinate. Converts between expressions for positive rational numbers including fractions and decimals.	Uses positive and negative numbers to represent quantities in real world contexts, recognizes that when two ordered pairs differ only by sign then the locations are related to reflections over one or both axes, and uses absolute value to find the distance between two points with the same first or second coordinate. Converts between expressions for positive rational numbers including fractions, decimals, and percents.	Solves real world problems involving the coordinate plane and absolute values.

Expressions and Equations					
Detailed	6.EE.A [1 to 4]	Recognizes exponential notation as repeated multiplication, identifies an expression matching a written statement where variables represent numbers, evaluates an expression at a specific value for a variable, and identifies when two simple expressions are equivalent.	Evaluates a single term involving whole number exponents, recognizes one or more parts of an expression as a single entity, evaluates an expression at specific values for each variable, and applies properties of operations to identify equivalent expressions.	Performs arithmetic operations including whole number exponents when no parenthesis or parentheses are present and applies properties of operations to identify and generate equivalent expressions.	Evaluates multi-step problems and generates equivalent expression involving rational numbers and whole number exponents in real world contexts.
Detailed	6.EE.B [5 to 8]	Uses substitution to determine whether a given value for a variable makes an equation or inequality true using whole numbers and recognizes that inequalities of the form x<c and x>c have infinitely many solutions and identifies them on a number line.	Solves an equation or inequality with a single operation using substitution to determine whether a given value in a set of values for a variable makes an equation or inequality true, and identifies solutions to compound inequalities on a number line.	Solves an equation or inequality as a process to answer a question and determines which value(s) in a set of values for a variable makes an equation or inequality true, and uses inequalities to show constraints in a real world context.	Creates a set of values that make an equation or inequality true, and creates a real world situation that corresponds to a given expression or constraint.
Detailed	6.EE.C [9]	Given a graph or table, identifies an algebraic equation for two quantities that change in relationship to one another.	Given a graph or table, identifies the dependent and independent variables and creates an algebraic equation to represent how these	Given a real world context, creates an equation to express the relationship between the dependent and independent variables	Creates a real world context using dependent and independent variables.

			quantities change in relationship to one another.	and creates graphs and tables relating to the equation.	

Geometry					
Detailed	6.G.A [1 to 3]	Finds the area given all the measurements for triangles or polygons decomposed into rectangles and triangles, finds the volume of a right rectangular prism with whole number edges, and creates polygons in the coordinate plane given coordinates for the vertices.	Finds the area given some measures for triangles or polygons by decomposing into rectangles and triangles, finds the volume of a right rectangular prism with one fractional edge, and uses coordinates to find the length of a side joining points with the same first or second coordinate.	Solves a real world context by finding the area given some measures for triangles or polygons by decomposing into rectangles and triangles, finds the volume of a right rectangular prism with fractional edges, and using coordinates for vertices of a polygon.	Solves real world multi-step geometric problems including decimal and fractional measurements, finds missing side length of a right rectangular prism given a volume and fractional side lengths, and finds a missing vertex of a polygon given other vertices.
Detailed	6.G.A [4]	Represents three-dimensional figures using nets comprised of rectangles and triangles.	Finds surface area for three-dimensional figures using nets.	Solves real world problems by finding surface area for three-dimensional figures using nets with whole number edges.	Solves real world problems by finding surface area for three-dimensional figures using nets with fractional edges.

Statistics and Probability					
Detailed	6.SP.A [1 to 3]	Recognizes a statistical question from a list of questions, identifies a graph given a data set or vice versa, and recognizes mean, median, and mode as a measure of center and range as a measure of variation.	Changes a question from being non-statistical to statistical, demonstrates that a set of data collected to answer a statistical question has a distribution that can be described by its measure of center and spread, and determines mean, median, mode, and range.	Recognizes that a statistical question anticipates variability, demonstrates that a set of data collected to answer a statistical question can be described by its measure of center and spread and overall shape, and recognizes that a measure of center summarizes all the values of a data set with a single value.	Creates a statistical question given a context, creates a data set with a given measure of center and/or spread and/or overall shape, and determines how additional data points impact the measure of center and/or spread and/or overall shape.
Detailed	6.SP.A [4 to 5]	Identifies an appropriate display for numerical data including dot plots, histograms, and box plots, and summarizes data from a line plot by counting the number of observations, determining the range, and/or a measure of center.	Constructs an appropriate display for numerical data including dot plots, histograms, and box plots, and summarizes data from a line plot by counting the number of observations, determining the range, and/or a measure of center, and identifying outliers or other striking deviations.	Summarizes numerical data sets in relation to their context.	Creates a histogram or box plot given a dot plot and creates a data set given a display.

Math
Grade 7

PLD	Standard	Minimally Proficient	Partially Proficient	Proficient	Highly Proficient
		The Minimally Proficient student	The Partially Proficient student	The Proficient student	The Highly Proficient student
Ratio and Proportional Relationships					
Detailed	7.RP.A [1]	Computes unit rates with ratios of two unit fractions having like or different units.	Computes unit rates with ratios of one non-unit fraction and one unit fraction having like or different units.	Computes unit rates with ratios of two non-unit fractions having like or different units. Ratios include side lengths.	Computes unit rates with ratios of two mixed numbers having like or different units. Ratios include areas.
Detailed	7.RP.A [2a to 2d]	Decides whether two quantities are in a proportional relationship and identifies the constant of proportionality (unit rate) in a representation that includes (0,0). Identifies the equation that models a relationship from a given representation with a proportional relationship. Explains what any point (x,y) on the graph of a proportional relationship means in terms of the situation, but not identify the unit rate.	Decides whether two quantities are in a proportional relationship and identifies the constant of proportionality (unit rate) in any simple representation, i.e. tables, equations, diagrams, verbal descriptions, graphs. Models a proportional relationship using an equation when given a simple table, graph, or verbal description. Explains what any point (x,y) on the graph of a proportional relationship means in terms of the	Decides whether two quantities are in a proportional relationship and identifies the constant of proportionality (unit rate) in any complex representation, (i.e. tables, equations, diagrams, verbal descriptions, graphs). Models a proportional relationship using an equation given a complex table, graph, or verbal description. Explains what any point (x,y) on the graph of a proportional relationship means in terms of the	Extends the given representation or creates a different representation that would represent the same proportional relationship. Creates a representation with a context that would represent a given proportional equation. Identifies a point (x,y) on the same graph as the point (1,r) for a proportional relationship and interprets the meaning of (x,y) in terms of the situation.

			situation, and can identify the unit rate when given the point (1,r).	situation and identify the unit rate.	
Detailed	7.RP.A [3]	Uses proportional relationships to solve simple ratio and percent problems.	Uses proportional relationships to solve simple ratio and percent problems in context.	Uses proportional relationships to solve multistep ratio and percent problems in context.	Creates equivalent proportional equations that could be used to solve the same ratio/percent problem in context.

The Number System					
Detailed	7.NS.A [1a to 2d]	Adds, subtracts, multiplies and divides rational numbers using a number line or other manipulatives.	Adds, subtracts, multiplies and divides simple rational numbers. Recognizes that the sum of a number and its opposite equals zero.	Adds, subtracts, multiplies, and divides rational numbers and determines the reasonableness of the solution. Understands $p + q$ as the number located a distance $\|q\|$ from p in a positive or negative direction, and understand subtraction as adding the additive inverse. Understands that $-(q/p) = (-p)/q = p/(-q)$. Converts a rational number to a decimal using long division and knows that the rational number terminates in 0 or eventually repeats. Knows that division by zero is undefined.	Interprets the sums of rational numbers in real-world contexts. Justifies the steps taken to add or subtract rational numbers. Interprets products and quotients of rational numbers in a real-world context.
Detailed	7.NS.A [3]	Solves simple real-world and mathematical problems involving the four operations with rational numbers using the number line or other manipulatives.	Solves simple real-world and mathematical problems involving the four operations with rational numbers.	Solves real-world and multistep mathematical problems involving the four operations with rational numbers.	Creates a story problem to model a given number sentence based on a real-world context and uses this to solve problems.

Expressions and Equations					
Detailed	7.EE.A [1 to 2]	Applies properties of operations as strategies to add, subtract, factor, and expand linear expressions (with whole number coefficients). Recognizes and explains the meaning of an expression in context (with integer coefficients).	Applies properties of operations as strategies to add, subtract, factor, and expand linear expressions (with integer coefficients). Recognizes and explains the meaning of an expression in context (with rational coefficients).	Applies properties of operations as strategies to add, subtract, factor, and expand linear expressions (with simple rational coefficients). Understands that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.	Applies properties of operations as strategies to add, subtract, factor, and expand linear expressions (with complex rational coefficients). Creates equivalent expressions given a problem context and explains key terms and factors of the problem for each expression.
Detailed	7.EE.B [3 to 4b]	Solves equations of the form $px + q = r$ and $p(x + q) = r$ with (rational coefficients).	Solves real-world or mathematical problems of the form $px + q = r$, $p(x + q) = r$, $px + q > r$, and $px + q < r$ with rational coefficients.	Creates a model and solves real-world or mathematical problems of the form $px + q = r$, $p(x + q) = r$, $px + q > r$, and $px + q < r$ with rational coefficients.	Creates a model and solves real- world or mathematical problems using equations and inequalities with rational coefficients and explains what the solution means.

Geometry					
Detailed	7.G.A [1]	Finds actual lengths given a geometric figure and a scale factor.	Finds actual lengths given two geometric figures with some unknown side measure when given the scale factor that relates the two figures.	Computes actual lengths and areas from a scale drawing, creates a scale drawing based on a context, and reproduces a scale drawing using a different scale.	Explains the relationship between scale factors of length and scale factors of areas for geometric figures and reproduce a scale drawing using a different scale.
Detailed	7.G.A [2]	Identifies geometric shapes given conditions on the sides or angles.	Constructs geometric shapes given a combination of angle and side conditions and determines whether it makes a particular shape.	Notices when conditions determine a unique triangle, more than one triangle, or no triangle.	Justifies the conditions for a unique triangle, more than one triangle or no triangle.
Detailed	7.G.A [3]	Identifies the 2-dimensional figure that results from a vertical or horizontal cut of a right rectangular prism.	Identifies the 2-dimensional figure that results from a vertical or horizontal cut of right rectangular pyramids.	Describes the 2-dimensional figure that results from a vertical, horizontal, or angled slice of a right rectangular prism.	Draws the 2-dimensional figure that results from a vertical, horizontal or angled slice of a right prism or pyramid.
Detailed	7.G.B [4]	Recognizes the formulas for area and circumference of a circle.	Calculates area and circumference given radius or diameter. Calculates radius or diameter given the circumference.	Determines the area given the circumference or vice versa. Solves real-world problems involving area and circumference. Gives an informal derivation of the relationship between circumference and area of a circle.	Understands how and why the formulas for area and circumference of a circle work. Explains the relationship between area of a circle and area of a parallelogram.

Detailed	7.G.B [5]	Identifies supplementary, complementary, vertical and adjacent angles.	Finds the unknown angle given another angle and their relationship.	Finds any of the unknown angles formed by two intersecting lines when measures are given algebraic expressions.	Creates and solves multi-step equations to find unknown angle measures given a figure with intersecting lines.
Detailed	7.G.B [6]	Finds the area of triangles, quadrilaterals and regular polygons. Finds the volume of cubes and right prisms.	Solves real-world problems involving surface area of 2-dimensional figures. Solve real-world volume problems for cubes and right prisms.	Solves real-world problems involving surface area of composite 2-dimensional figures. Solves real- word problems involving volume of 3-dimensional objects.	Uses relationships between volume and surface area of 3 dimensional shapes to solve real-world problems.

Statistics and Probability					
Detailed	7.SP.A [1 to 2]	Identifies and recognizes sample populations given a scenario describing the entire population.	Recognizes that a random sample produces the most valid representation of the entire population.	Makes inferences about a population based on representative samples. Uses multiple samples to gauge variations in estimates or predictions.	Identifies and justifies the most representative sampling method for a situation. Chooses or creates a method of generating multiple samples to gauge variations in estimates or predictions.
Detailed	7.SP.B [3 to 4]	Identify basic measures of central tendency to compare two different populations.	Uses measures of central tendency to draw comparisons about two different populations.	Uses measures of central tendency and variability to make comparative inferences about two populations in any context.	Compares two visual representations of data to make comparative inferences about the central tendency and variability of two populations in context.
Detailed	7.SP.C [5]	Understands that the probability of a chance event is a number between 0 and 1.	Understands that if the probability of a chance event is closer to 1, it is likely to happen and if it is closer to 0, it is not likely to happen.	Identifies the probability of a chance event as impossible (0), unlikely, equally likely or unlikely (.5), more likely, or certain (1). Represents the probability as a fraction, decimal, or percent.	Compares probabilities of two or more events and justify the likelihood of each event.
Detailed	7.SP.C [6]	Makes approximations of probability for a chance event.	Uses the results of an experiment to make approximations of probability for an event.	Compares the relative frequency of an event to the theoretical probability of the event.	Recognizes and justifies why the experimental probability approaches the theoretical probability as the relative frequency of

					an event increases.
Detailed	7.SP.C [7a to 7b]	Determines the theoretical probability of a simple event.	Determines the theoretical probability of a simple event and uses observed frequencies to create a uniform probability model.	Determines the theoretical probability of an event and uses observed frequencies to create a probability model for the data from a chance process (where outcomes are uniform or not uniform).	Compares and justifies the experimental and theoretical probability in a given situation.
Detailed	7.SP.C [8a to 8c]	Determines the sample space for compound events.	Determines the theoretical probability of a compound event.	Designs a simulation to generate frequencies for compound events.	Compares different simulations to see which best predicts the probability.

Math
Grade 8

PLD	Standard	Minimally Proficient	Partially Proficient	Proficient	Highly Proficient
		The Minimally Proficient student	The Partially Proficient student	The Proficient student	The Highly Proficient student
The Number System					
Detailed	8.NS.A [1 to 2]	Identifies square roots of nonsquare numbers and pi as irrational numbers. Understands that every number has a decimal expansion. Identifies rational or irrational numbers and converts familiar rational numbers with one repeating digit to fraction form.	Compares and orders rational and irrational numbers. Identifies irrational decimal expansions as approximations. Identifies rational and irrational numbers and converts less familiar rational numbers to fraction form.	Places irrational numbers on a number line. Uses approximations of irrational numbers to estimate the value of an expression. Converts decimals into rational numbers.	Explains how to get more precise approximations of square roots. Notices and explains the patterns that exist when writing rational numbers as fractions.

Expressions and Equations					
Detailed	8.EE.A [1 to 2]	Knows the properties of natural number exponents. Evaluates square roots of small perfect squares.	Applies the properties of natural number exponents to generate equivalent numerical expressions. Solves mathematical equations without context of the form x^2=p and x^3=p, where p is a positive rational number.	Knows and applies the properties of integer exponents to generate equivalent numerical expressions. Uses square root and cube root symbols to represent solutions to equations of the form x^2=p and x^3=p, where p is a positive rational number.	Uses properties of integer exponents to order or evaluate multiple numerical expressions with integer exponents. Explains how square roots and cube roots relate to each other and to their radicands.
Detailed	8.EE.A [3 to 4]	Uses numbers expressed in the form of a single digit times an integer power of 10. Represents very large and very small quantities in scientific notation.	Uses numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities. Multiplies and divides numbers in scientific notation.	Expresses how many times as much a number written as an integer power of 10 is than another number. Performs operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used.	Converts between decimal notation and scientific notation and compares numbers written in different forms. Calculates and interprets values written in scientific notation within a context.
Detailed	8.EE.B [5 to 6]	Graphs proportional relationships, interpreting the unit rate as the slope. Determines the slope of a line given a graph.	Compares two different proportional relationships using the same representation. Derives the equation y=mx for a line through the origin.	Compares two different proportional relationships represented in different ways. Recognizes and explains why the slope m is the same between any two distinct points	Generates a representation of a proportional relationship with specific qualities. Compares and contrasts situations in which similar triangles would and would not

				on a non-vertical line. Derives the equation y=mx+b for a line that does not pass through the origin.	yield lines with the same slope.
Detailed	8.EE.C [7 to 8c]	Solves simple linear equations with integer coefficients. Identifies systems of equations that have one, infinite, or no solutions from graph. Estimates the solution of a system given a graph.	Solves multistep linear equations with rational coefficients and identifies equations that have one solution, infinitely many solutions, or no solutions. Solves a system of linear equations using any method.	Solves multistep linear equations with rational coefficients and variables on both sides and provides examples of equations that have one solution, infinitely many solutions, or no solutions. Provides examples of systems of equations that have a specified number of solutions. Creates and utilizes a system of linear equations to solve a real-world problem.	Justifies why an equation has one solution, infinitely many solutions, or no solution. Solves real-world and mathematical problems leading to two linear equations in two variables.

Functions					
Detailed	8.F.A [1 to 3]	Identifies whether a relation is a function from a graph or a mapping. Creates a graph from a function expressed as an equation. Determines whether a function is linear or nonlinear from a graph.	Identifies whether a relation is a function from any representation. Given a representation of a function, creates another representation of that function. Determines whether a function is linear or nonlinear from an equation.	Explains that a function is a rule that assigns to each input exactly one output and that the graph of a function is the set of ordered pairs consisting of an input and the corresponding output. Compares properties of two functions each represented in a different way. Determines whether or not a function is linear or nonlinear from any representation. Gives examples of functions that are not linear.	Creates any representation of a relation and explain why it is a function or not a function. Justifies whether two functions represented in different ways are equivalent or not by comparing their properties. Explains why the function is linear or nonlinear.
Detailed	8.F.B [4 to 5]	Determines the rate of change of the function from a graphical description of the linear function. Describes qualitatively the functional relationship between two quantities by analyzing some features of a graph (e.g., linear and nonlinear).	Determines the rate of change and initial value of the function from two (x,y) values. Creates a graph of identified information. Describes qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing).	Interprets the rate of change and initial value of a linear function in terms of the situation it models or its graph/table of values. Constructs a function to model a linear relationship between two quantities. Sketches a graph that exhibits given qualitative features of a function.	Identifies what prevents a set of values in either a table or graph from being linear and adjusts the values to make them linear. Interprets qualitative features of a function in a context.

Geometry					
Detailed	8.G.A [1a to 4]	Identifies visual representations and congruent figures that result after one transformation. Recognizes that it takes a combination of transformations and dilations to produce a similar figure.	Identifies the angles that correspond after a transformation. Identifies a transformation between two congruent figures. Describes the effect of reflections and translations on two-dimensional figures using coordinates and coordinate notation. Identifies dilations of figures by a given scale factor and transformations.	Verifies experimentally the properties of rotations, reflections and translations. Describes the effect of transformations on two-dimensional figures using coordinates and coordinate notation, including whether the transformations lead to similar or congruent figures.	Recognizes and explains the properties of transformations in real-world graphic illustrations and visual representations, including whether the transformations lead to similar or congruent figures.
Detailed	8.G.A [5]	Knows that the sum of angles of a triangle equals 180 degrees, and identifies angle pairs when parallel lines are cut by a transversal.	Finds unknown angle measures in a triangle, and unknown angle measures for angle pairs when parallel lines are cut by a transversal.	Gives an informal argument for the sum of angles of a triangle, the measure of an exterior angle of a triangle, and congruent angle relationships when parallel lines are cut by a transversal.	Gives an informal argument that a triangle can only have one 90 degree angle. Gives an informal argument for the pairs of angles that are supplementary when parallel lines are cut by a transversal.
Detailed	8.G.B [6 to 8]	Knows the Pythagorean Theorem and that it applies to right triangles. Calculates unknown hypotenuse side length given the Pythagorean Theorem. Applies the	Understands the proof of the Pythagorean Theorem and its converse. Calculates unknown side lengths using the Pythagorean Theorem given at least	Understands and explains the proof of the Pythagorean Theorem and its converse. Applies the Pythagorean Theorem to a real-world situations	Models a proof of the Pythagorean Theorem and its converse using a pictorial representation. Recognizes situations and applies the Pythagorean Theorem

		Pythagorean Theorem to find the distance between two points in a coordinate system with the right triangle drawn where the Pythagorean Theorem is given.	two different side lengths of a right triangle. Applies the Pythagorean Theorem to find the distance between two points in a coordinate system with the right triangle drawn where the Pythagorean Theorem is not given.	in two and three dimensions to determine unknown side lengths. Applies the Pythagorean Theorem to find the distance between two points in a coordinate system.	in multi- step problems. Finds the coordinates of a point which is a given distance (non-vertical and non- horizontal) from another point.
Detailed	8.G.C [9]	Finds the volume of a cylinder.	Finds the volume of a cone, cylinder or sphere.	Knows the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world mathematical problems.	Describes the relationship between the formulas for volumes of cones, cylinders, or spheres. Explains the derivation of the formulas for cones, cylinders, and spheres.

Statistics and Probability					
Detailed	8.SP.A [1 to 4]	Constructs a scatter plot. Recognizes a straight line can be used to describe a linear association on a scatter plot. Identifies the slope and y-intercept of a linear model on a scatter plot. Completes a partially filled-in two-way table and interpret the table by row or column.	Constructs a scatter plot and describes the pattern as positive, negative or no relationship. Draws a straight line on a scatter plot that closely fits the data points. Identifies possible data points given a linear model. Constructs a two-way table of categorical data.	Describes patterns in a scatter plot. Judges how well the trend line fits the data by looking at the closeness of the data points. Interprets the meaning of the slope and y-intercept in context. Interprets and describes relative frequencies for possible associations from a two-way table.	Constructs and interprets scatter plots to investigate patterns of association between two quantities. Compares more than one trend line for the same scatter plot and justifies which one best fits the data. Creates and uses a linear model based on a set of bivariate data to solve a real-world problem. Interprets and compares relative frequencies to identify patterns of association.

Math
Algebra I

PLD	Standard	Minimally Proficient	Partially Proficient	Proficient	Highly Proficient
		The Minimally Proficient student	The Partially Proficient student	The Proficient student	The Highly Proficient student
Number and Quantity					
Detailed	N-RN.B [3]	Explains why adding and multiplying two rational numbers results in a rational number	Explains why adding a rational number to an irrational number results in an irrational number	Explains why multiplying a nonzero number to an irrational number results in an irrational number.	Generalizes and develops rules for sum and product properties of rational and irrational numbers.
Algebra					
Detailed	A-SSE.A [1a to 1b]	Identifies some of the basic terms (base, exponent, coefficient, and factor) of a linear or exponential expression.	Identifies all of the basic terms (base, exponent, coefficient, and factor) of linear and exponential expressions.	Interprets complicated expressions by viewing one or more of their parts as a single entity.	Explains the context of different parts of a formula presented as a complicated expression.
Detailed	A-SSE.A [2]	Can identify different forms for the same expression.	Justifies the different forms based on mathematical properties.	Recognizes equivalent forms of numerical and polynomial expressions in one variable and uses the structure of the expression to identify ways to rewrite it.	Rewrites numerical and polynomial expressions to equivalent forms, using the structure of the expression. Interprets different symbolic notation. Makes generalizations by rewriting expressions in context, using their structure.
Detailed	A-SSE.B [3a]	Identifies the zeroes of	Factors a quadratic	Factors a quadratic	Explains conditions for

		a quadratic expression written in factored form.	expression without a leading coefficient.	expression to reveal the zeroes of the function it defines.	two, one, and no real roots.
Detailed	A-SSE.B [3b]	Identifies the maximum or minimum of a function, using the graph.	Identifies the maximum or minimum of a function when given in vertex form.	Completes the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	Completes the square in a quadratic expression (where b is not divisible by two).
Detailed	A-SSE.B [3c]	Knows the properties of exponents	Applies the properties of exponents.	Uses the properties of exponents to transform expressions for exponential functions with integer exponents modeling a real-world context.	Interprets properties of exponential functions by transforming them into equivalent expressions that reveal properties within a context.
Detailed	A-APR.A [1]	Identifies polynomial expressions.	Adds, subtracts, and multiplies polynomials.	Understands that polynomials are closed under the operations of addition, subtraction, and multiplication.	Creates equivalent polynomial expressions using the fact that polynomials are closed under the four operations.
Detailed	A-APR.B [3]	Identifies the zeros of a quadratic function from a graph.	Use zeros to sketch the graph of a quadratic function given in factored form.	Factor a quadratic function and use zeroes to sketch a graph of the function.	Identify zeros from the graph and use zeroes to construct the quadratic function.
Detailed	A-CED.A [1 and 4]; A-REI.B [3]	Distinguishes between linear equations, inequalities, and non-linear equations.	Solves linear equations and inequalities in one variable with constant coefficients.	Creates and solves linear equations and inequalities in one variable, including equations with coefficients represented	Creates, rearranges, and solves exponential equations with integer exponents or quadratic equations.

				by letters to solve problems with a real world context. Rearranges formulas to highlight a quantity of interest, using the same reasoning as in solving equations.	
Detailed	A-CED.A [2]; A-REI.D [12]	Writes and graphs an equation to represent a linear relationship. Identifies a solution region when the graph of a linear inequality is given.	Writes and graphs an equation to represent an exponential relationship. Graphs the solutions to a linear inequality in two variables as a half-plane.	Constructs equations and graphs that model linear and exponential relationships (with context). Graphs solutions of the system of inequalities and identifies the solution set as a region of the coordinate plane that satisfies both inequalities.	Compares and contrasts equations and graphs that model linear and exponential relationships. Writes or creates a system of linear inequalities given a context or graph and identifies the solution set as a region of the coordinate plane that satisfies all inequalities.
Detailed	A-CED.A [3]	Determines whether a point is a solution to a system of equations and/or inequalities given a graph or equations.	Interprets solutions as viable or non-viable options in a modeling context where constraints are presented verbally.	Represents constraints by equations or inequalities, and by systems of equations and/or inequalities.	Defends and justifies solutions or non-solutions in a modeling context.
Detailed	A-REI.A [1]	Solves a quadratic equation with multiple steps, without justifying the steps involved in solving.	Describes the steps in solving quadratic equations.	Explains and justifies the steps in solving linear equations by applying the properties of equality, inverse, and identity.	Explains and justifies the steps in solving linear and quadratic equations by applying and naming the properties of equality, inverse, and

					identity.
Detailed	A-REI.B. [4a to 4b]	Solves quadratic equations with real solutions by simple inspection.	Solves quadratic equations by factoring.	Solves quadratic equations with real solutions by inspection (e.g., for x^2 = 49)-- taking square roots, completing the square, the quadratic formula, and factoring-- as appropriate to the initial form of the equation.	Determines the most efficient method for solving a quadratic equation and justifies the choice selected. Recognize cases in which a quadratic equation has no real solutions.
Detailed	A-REI.C [5 to 6]	Explains the use of the multiplication property of equality to solve a system of equations. Solves a system of linear equations approximately when given a graph of the system.	Explains why the sum of two equations is justifiable in the solving of a system of equations. Tests a solution to the system in both original equations (both graphically and algebraically).	Relates the process of linear combinations with the process of substitution for solving a system of linear equations. Solves a system of linear equations exactly and approximately by choosing the best method depending on the representation of the equations	Proves that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. Analyzes the system of equations and is able to solve exactly and approximately given a context or real-world situation. Solves a system of equations and manipulates one of the equations to provide additional information or an additional given solution.
Detailed	A-REI.D [10 to 11]	Identifies solutions and	Identifies solutions and	Graphs points that	Describes viable

		non-solutions of linear equations in two variables. Finds the point where two lines or exponential curves intersect on a graph or approximates solutions using other methods such as a table or technology.	non-solutions of exponential equations in two variables. Finds and explains why the solution to a system linear, polynomial, rational, or absolute value equations is the point where the two intersect.	satisfy linear and exponential equations. Models the solutions of a system of linear equations and/or exponential equations showing the solutions using technology, tables, graphs, approximations. Finding the solutions approximately is limited to cases where f(x) and g(x) are polynomial functions.	solutions using the knowledge that continuous lines and curves contain an infinite number of solutions. Explains why there are infinitely many solutions when $f(x) = g(x)$.

Functions					
Detailed	F-IF.A [1 to 2]; F-IF.B [5]	Identifies functions and their domains	Evaluates a function for inputs in the domain, and writes functions using function notation (without context).	Uses function notation and evaluates functions for inputs in their domain, and interprets statements that use function notation in terms of context.	Applies and extends knowledge of domain and range to real world situations and contexts; creates a function for a given context where the domain meets given parameters.
Detailed	F-IF.B [4]	Identifies the key features (as listed in the Standard) when given a linear, quadratic, square root, cube root, piecewise-defined functions (including step functions and absolute value functions), and exponential functions (with domains in the integers).	Interprets the key features (as listed in the Standard) when given a graph of a linear, quadratic, square root, cube root, piecewise-defined functions (including step functions and absolute value functions), and exponential functions (with domains in the integers).	Identifies and interprets the key features (as listed in the Standard) when given a table of values. Sketches graphs of linear, quadratic, square root, cube root, piecewise-defined functions (including step functions and absolute value functions), and exponential functions (with domains in the integers) showing key features, when given a verbal description of the relationship.	Accurately creates a story or context that models the given key features of linear, quadratic, square root, cube root, piecewise-defined functions (including step functions and absolute value functions), and exponential functions (with domains in the integers).
Detailed	F-IF.B [6]	Determines the rate of change of a linear function presented algebraically.	Determines the rate of change of an exponential function presented algebraically, over a given interval.	Calculates and interprets the average rate of change of a function presented symbolically or as a table over a specified	Describes the different rates of change over given intervals of the graph .

				interval.	
Detailed	F-IF.C [7a to 7b, and 8a]	Evaluates linear, quadratic, piecewise, step, and absolute value functions	Identifies key features of linear, quadratic, piecewise, step, and absolute value functions when the graph is given.	Graphs linear, quadratic, piecewise, step, and absolute value functions, showing intercepts, maxima, and minima. Can graph functions expressed symbolically and can show key features of the graph (by hand in simple cases, and using technology for more complicated cases).	Graphs and compares linear, quadratic, piecewise, step, and absolute value functions in various forms.
Detailed	F-IF.C [9]	Compares slopes and y-intercepts of two linear functions where one is presented graphically and the other is presented in slope-intercept form.	Compares growth rates and intercepts of two functions where one is presented graphically and the other is presented in function notation.	Uses tables, graphs, algebra, and verbal descriptions to compare properties of two functions (linear, quadratic, square root, cube root, piecewise-defined functions (including step functions and absolute value functions), and exponential functions with domains in the integers), when each is presented a different way.	Constructs a linear, quadratic, square root, cube root, piecewise-defined functions (including step functions and absolute value functions), and exponential functions with domains in the integers that has a characteristic (i.e. slope, intercept, maximum) that is greater than or lesser than a given function.
Detailed	F-BF.A [1]; F-IF.A [3]; F-LE.A [2]	Identifies the parts of a recursive function or sequence.	Defines and expresses a recursive sequence as a function, constructs a	Recognizes that sequences are functions with a domain that is a	Applies sequences, sometimes expressed as recursive functions,

			linear function (not multi-step) given a graph, a description of a relationship, or two input-output pairs.	subset of the integers, can generate a recursive function to express a sequence and generate a sequence given a recursive function, constructs an exponential function (not multi-step) given a graph, a description of a relationship, or two input-output pairs.	to real world contexts.
Detailed	F-BF.B [3]	Relates the vertical translation of a linear function to its y-intercept.	Performs vertical translations on linear, quadratic, square root, cube root, piecewise-defined functions (including step functions and absolute value functions), and exponential functions with domains in the integers.	Performs vertical translations on graphs. Describes what will happen to a function when f(x) is replaced by f(x) + k, k f(x), f(kx), and f(x+k) for different values of k.	Finds the value of k given f(x) replaced by f(x) + k, k f(x), f(kx), and f(x+k) on a graph of linear, quadratic, square root, cube root, piecewise-defined functions (including step functions and absolute value functions), and exponential functions with domains in the integers.
Detailed	F-LE.A [1a to 1c]	Recognizes situations in which one quantity changes at a constant rate per unit interval relative to another.	Recognizes relationships in tables and graphs that can be modeled with linear functions (constant rate of change) and with exponential functions (multiplicative rate of	Justifies that linear functions grow by equal differences over equal intervals; exponential functions grow by equal factors over equal intervals. (ex- percent change)	Describes the rate of change per unit as constant or the growth factor as a constant percentage. Proves that linear functions grow by equal differences over equal intervals;

			change)		exponential functions grow by equal factors over equal intervals.
Detailed	F-LE.A [3]	Compares the values of linear and exponential functions at specific points.	Compares the values of linear and exponential functions over various intervals.	Observes, using graphs and tables, that a quantity increasing exponentially eventually exceeds a quantity that is increasing linearly or quadratically.	Observes, explores, predicts, models, and evaluates different situations in which linear and exponential functions are compared.
Detailed	F-LE.B [5]	Identifies which values are constant from a given context.	Interprets the slope and x-and y- intercepts in a linear function in terms of a context.	Interprets the base value and vertical shifts in an exponential function of the form f(x) = b^x+ k , where b is an integer and k can equal zero, in terms of context.	Interprets the base value and initial value in an exponential function of the form f(x) = a*b^x, where b is an integer, and a can be any positive integer including 1, in terms of context.

Statistics					
Detailed	S-ID.A [1]	Identifies dot plots, histograms, and box plots for a given set of data.	Graphs numerical data on a real number line using dot plots, histograms, and box plots.	Describes and gives a simple interpretation of a graphical representation of data on dot plots, histograms, and box plots.	Determines and justifies which type of data plot on a real number line would be most appropriate for a set of data. Identify advantages and disadvantages of different types of data plots.
Detailed	S-ID.A [2 to 3]	Describes informally the center and spread of a single set of data or graph. Identifies shape, center, and spread of a data set.	Compares informally the similarities or differences in shape, center, or spread between two graphs. Identifies and states the effects of existing outliers.	Explains and interprets similarities and differences using specific measures of center and spread, given two sets of data or two graphs with possible effects from existing outliers.	Plots data based on situations with multiple data sets, and then compares and discusses using measures of center and spread and explores the manipulation of additional data points.. Justifies which measure(s) are most appropriate for comparison. Identifies advantages and disadvantages of using each measure of center and spread.
Detailed	S-ID.B [5]	Explains data in a two-way frequency table.	Creates a two-way frequency table showing the relationship between two categorical	Finds and interprets joint, marginal and conditional relative frequencies. Recognizes possible	Given a context, interprets, identifies, and describes associations and trends using a two-

			variables.	associations and trends in the data.	way frequency table.
Detailed	S-ID.B [6a to 6c]	Creates a scatter plot of bivariate data.	Determines if a plotted data set is approximately linear.	Creates a scatter plot of bivariate data and estimates a linear function that fits the data. Uses this function to solve problems in the context of the data.	Compares the fit of different functions, including exponential functions with domains in the integers, to data and determines which function has the best fit.
Detailed	S-ID.C [7]	Identifies a linear model of bivariate data.	Graphs data in a scatter plot, identify the slope and y- intercept of a linear model.	Using a line fitted to data, interprets the slope (rate of change) and the intercept (constant term) of a linear model in the context of the situation and data.	Using a function that best fits the data, interpolates and extrapolates trends in the data.
Detailed	S-ID.C [8 to 9]	Uses a table or graph of a set of data to informally describe a correlation. Defines causation and correlation.	Identifies the existence of or non-existence of causation in the context of a correlated problem. Computes the correlation coefficient of a set of linearly- related data using technology.	Interprets the correlation coefficient of a linear fit in the context of a situation using technology. Determines whether the correlation shows a weak positive, strong positive, weak negative, strong negative, or no correlation. Distinguishes between causation and correlation in the context of a situation with data.	Supports or refutes a hypothesized correlation between two sets of data. Supports or refutes claims of causation with the understanding that a strong correlation does not imply causation.

Math
Geometry

PLD	Standard	Minimally Proficient	Partially Proficient	Proficient	Highly Proficient
		The Minimally Proficient student	The Partially Proficient student	The Proficient student	The Highly Proficient student
Congruence					
Detailed	G-CO.A [1]	Identifies an angle, circle, perpendicular line, parallel line, and line segment using proper notation.	Informally defines an angle, circle, perpendicular line, parallel line, and line segment using examples and non-examples.	Can explain definitions of an angle, circle, perpendicular line, parallel line, and line segment based on the notions of point, line, distance along a line, and distance around a circular arc.	Identifies real-life examples of an angle, circle, perpendicular line, parallel line, and line segment using precise definitions.
Detailed	G-CO.A [2 and 4]	Describes reflections, rotations, and translations. Identifies rotations, reflections, and translations given an image and its transformation.	Describes dilations. Informally describes rotations, reflections, and translations using examples and non-examples.	Compares transformations in the plane and understands them as functions that take points in the plane as inputs and give other points as outputs. Develops definitions of rotations, reflections, and translations using the terms angles, circles, perpendicular lines, parallel lines, and line segments.	Represents functions to describe transformations using a variety of media. Justifies statements about rotations, reflections, and translations on the coordinate plane.
Detailed	G-CO.A [3]	Distinguishes between rotations and reflections given a rectangle,	Identifies lines and points of symmetry given a rectangle,	Describes the rotations and reflections that carry a given rectangle,	Identifies a rectangle, parallelogram, trapezoid, or regular

		parallelogram, trapezoid, or regular polygon and its transformation.	parallelogram, trapezoid, or regular polygon and its reflection or rotation.	parallelogram, trapezoid, or regular polygon onto itself.	polygon that satisfies a description of rotational symmetry or lines of symmetry.
Detailed	G-CO.A [5]	Performs rotations, reflections, and translations on a given figure.	Identifies a sequence of transformations that will carry a given figure onto another.	Performs rotations, reflections, and translations using a variety of methods and specifies the sequence of transformations that will carry a given figure onto another.	Explains how the order of a sequence of transformations is performed may result in different outcomes.
Detailed	G-CO.B [6]	Explains transformations of a given figure based on descriptions of rigid motion.	Predicts the effect of a transformation of a given figure based on descriptions of rigid motion.	Creates congruent figures using transformations of rigid motion.	Justifies the congruence of two complex figures using properties of rigid motion.
Detailed	G-CO.B [7]	Identifies corresponding pairs of angles or corresponding pairs of sides of two triangles that are congruent.	Identifies corresponding pairs of angles and corresponding pairs of sides of two triangles that are congruent.	Shows that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent (CPCTC) using the definition of congruence in terms of rigid motions.	Justifies that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent in a context.
Detailed	G-CO.B [8]	Identifies corresponding parts of two congruent triangles.	Identifies the minimum conditions necessary for triangle congruence (ASA, SAS, SSS).	Demonstrates how the criteria for triangle congruence (ASA, SAS, SSS) follow from the definition of congruence	Understands and explains why SSA and AAA do not provide enough evidence for triangle congruence.

				in terms of rigid motions.	
Detailed	G-CO.C [9]	Describes examples of theorems about lines and angles.	Determines the validity of statements within a given proof of a theorem about lines and angles.	Proves theorems about lines and angles.	Applies theorems about lines and angles to a real-life context.
Detailed	G-CO.C [10]	Describes examples of theorems about triangles.	Determines the validity of statements within a given proof of a theorem about triangles.	Proves theorems about triangles. (Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.)	Applies theorems about triangles to a real-life context.
Detailed	G-CO.C [11]	Defines theorems about parallelograms.	Determines the validity of statements within a given proof of a theorem about parallelograms.	Proves theorems about parallelograms.	Applies theorems about parallelograms to a real-life context.
Detailed	G-CO.D [12 to 13]	Copies a line segment and an angle. Constructs congruent segments and perpendicular lines.	Bisects a line segment and an angle. Constructs an equilateral triangle, a square, and a regular hexagon.	Constructs perpendicular lines, a perpendicular bisector of a line segment, and a line parallel to a given line through a point not on the line. Constructs an equilateral triangle, a	Creates a polygon given certain attributes using geometric constructions. Explores the construction of other regular polygons inscribed in a circle.

				square, and a regular hexagon inscribed in a circle.	

Similarity, Right Triangles and Trigonometry					
Detailed	G-SRT.A [1a to 1b]	Identifies dilations.	Identifies the scale factors of dilations.	Verifies the properties of dilations given by a center and a scale factor, by understanding that a dilation creates parallel lines and line segments in ratios of the scale factor.	Locates the center of dilation and scale factor, given a pair of similar figures on a coordinate plane.
Detailed	G-SRT.A [2]	Identifies corresponding parts of two similar figures.	Determines if two given figures are similar.	Explains that two given figures are similar in terms of similarity transformations.	Proves or disproves that two given figures are similar, using transformations and the definitions of similarity.
Detailed	G-SRT.A [3]	Identifies similarity transformations.	Identifies triangle similarity by the use of the AA criterion.	Establishes the AA criterion for two triangles to be similar by using the properties of similarity transformations.	Proves that two triangles are similar if two angles of one triangle are congruent to two angles of the other triangle, using the properties of similarity transformations.
Detailed	G-SRT.B [4]	Defines theorems about triangles.	Determines the validity of statements within a given proof of a theorem about triangles.	Proves theorems about triangles. (Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.)	Applies theorems about triangles to a real-life context.

Detailed	G-SRT.B [5]	Finds measures of sides and angles of congruent and similar triangles.	Solves problems involving triangles, using congruence and similarity criteria.	Solves problems and proves relationships in geometric figures by using congruence and similarity criteria for triangles. Includes problems from context.	Proves conjectures about congruence or similarity in geometric figures, using congruence and similarity criteria for triangles. Includes problems from context.
Detailed	G-SRT.C [6]	Understands that, in similar triangles, corresponding angles are congruent and ratios of corresponding sides are equal. Understands that the acute angles of a right triangle are complementary.	Defines sine, cosine, and tangent as the ratio of sides of a right triangle. Identifies the relationship between the sine and cosine of the acute angles of a right triangle.	Understands that the ratio of two sides in one triangle is equal to the ratio of the corresponding two sides of all other similar triangles, leading to definitions of trigonometric ratios for acute angles. Explains the relationship between the sine and cosine of complementary angles.	Determines the similarity of right triangles by comparing the trigonometric ratios of the corresponding sides. Solves for missing angles of right triangles using sine and cosine.
Detailed	G.SRT.C [7]	Understands that the acute angles of a right triangle are complementary.	Identifies the relationship between the sine and cosine of the acute angles of a right triangle.	Explains the relationship between the sine and cosine of complementary angles.	Solves for missing side lengths of right triangles when given a fraction that is equivalent to the sine or cosine of one of the angles.
Detailed	G-SRT.C [8]	Solves right triangles using the Pythagorean Theorem.	Applies the Pythagorean Theorem in real-life and mathematical contexts.	Solves right triangles using trigonometric ratios and the Pythagorean Theorem in applied/contextual problems.	Models solutions to situations, using trigonometric ratios and the Pythagorean Theorem, by constructing equations

					that can be used to solve the problem. Including problems from context.

Circles					
Detailed	G-C.A [1]	Knows that the definition of a circle as points equidistant to a given point.	Recognizes that all circles are similar.	Proves that all circles are similar.	Solves applied math problems, using the fact that all circles are similar.
Detailed	G-C.A [2]	Identifies inscribed angles, radii, and chords in circles.	Recognizes relationships among inscribed angles, radii, and chords in circles.	Describes relationships among inscribed angles, radii, and chords in circles.	Solves problems using relationships among inscribed angles, radii, and chords in circles.
Detailed	G-C.A [3]	Identifies inscribed and circumscribed circles of a polygon.	Constructs the inscribed and circumscribed circles of a triangle.	Proves properties of angles for a quadrilateral inscribed in a circle.	Proves the unique relationships between the angles of a triangle or quadrilateral inscribed in a circle.
Detailed	G-C.B [5]	Defines a sector area of a circle as a proportion of the entire circle.	Develops the definition of radians as a unit of measure by relating to arc length.	Derives the formula for the area of a sector, and derives, using similarity, the fact that the length of the arc intercepted by an angle is proportional to the radius.	Proves that the length of the arc intercepted by an angle is proportional to the radius, with the radian measure of the angle being the constant of proportionality.

Expressing Geometric Properties with Equations					
Detailed	G-GPE.A [1]	Identifies the center and radius of a circle, given an equation written in (x - h)^2 + (y - k)^2 = r^2 form.	Creates the equation for a circle, when given the center and radius.	Completes the square to find the center and radius of a circle given by its equation.	Determines the equation of a circle, given points of tangency.
Detailed	G-GPE.B [4]	Solves problems algebraically, using geometric theorems involving a circle on the coordinate plane. Locates segments on a coordinate plane that are parallel or perpendicular by calculating slope.	Proves simple geometric theorems using coordinates, when given a visual representation on the coordinate plane.	Proves simple geometric theorems algebraically using coordinates, such as proving a point lies on a given circle.	Constructs visual representations on the coordinate plane that meet given conditions for coordinates. Justifies statements about geometric figures using coordinates.
Detailed	G-GPE.B [5]	Can explain why the slopes of parallel lines are equal and the slopes of perpendicular lines are negative reciprocals or one that is 0 and the other that is undefined.	Creates the equation of a line that passes through a specific point given its slope.	Creates the equation of a line parallel or perpendicular to a given line that passes through a given point.	Creates the equation of a line parallel or perpendicular to a given line that passes through a given point in a context.
Detailed	G-GPE.B [6]	Finds the point on a line segment that partitions the segment in a given ratio, given a visual representation of the line segment.	Finds the point on a line segment that partitions the segment in a given ratio, given coordinates for the line segment.	Finds the point on a directed line segment (between two given points) that partitions the segment in a given ratio.	Constructs a line segment that is partitioned in a given ratio.
Detailed	G-GPE.B [7]	Calculates the perimeter	Calculates areas of a	Calculates areas of any	Calculates perimeters of

		of a polygon.	rectangle and right triangle given their coordinates.	triangle given its coordinates.	polygons and areas of triangles and rectangles using their coordinates from a contextual problem.

Geometric Measurement and Dimension					
Detailed	G-GMD.A [1]	Informally describes the formulas for the circumference and area of a circle.	Informally describes the formulas for the volume of a cylinder, pyramid, and cone by the use of dissection arguments.	Explains the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.	Justifies the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.
Detailed	G-GMD.A [3]	Substitutes given dimensions into the formulas for the volume of cylinders, pyramids, cones, and spheres.	Computes the volume of cylinders, pyramids, cones, and spheres, given a graphic.	Solves problems using the volume formulas for cylinders, pyramids, cones, and spheres.	Finds the volume of cylinders, pyramids, cones, and spheres in a real-life context.
Detailed	G-GMD.B [4]	Identifies the shapes of two-dimensional cross-sections formed by a vertical or horizontal plane.	Identifies a three-dimensional object generated by rotations of a simple two-dimensional object about a line of symmetry of the object.	Identifies the shapes of two-dimensional cross-sections of three-dimensional objects. Identifies a three-dimensional object generated by rotations of two-dimensional objects.	Sketches the shape of a particular two-dimensional cross-section of a three-dimensional shape. Sketches the three-dimensional object that results from the rotation of a given two-dimensional object.

Modeling with Geometry					
Detailed	G-MG.A [1]	Identifies geometric shapes that model a real-world object.	Uses a geometric shape modeled in a simple real-world object to determine the appropriate measures.	Uses geometric shapes, measures, and properties to model and describe objects.	Uses composite geometric shapes, measures, and properties to model and describe objects.
Detailed	G-MG.A [2]	Calculates density based on area, when a formula is given.	Calculates density based on volume (when a formula is given), and identifies appropriate unit rates.	Uses properties of density based on area and volume to model a situation in context.	Compares and contrasts density rates in a modeling context.
Detailed	G-MG.A [3]	Identifies relevant geometric models for use in solving a design problem.	Compares quantitatively different proposed solutions to a design problem, using geometric properties of the solution.	Designs a structure to meet constraints and optimization requirements.	Designs a composite structure to meet constraints and optimization requirements.

Math
Algebra II

PLD	Standard	Minimally Proficient	Partially Proficient	Proficient	Highly Proficient
		The Minimally Proficient student	The Partially Proficient student	The Proficient student	The Highly Proficient student
Number and Quantity					
Detailed	N-RN.A [1 to 2]	Uses proper notation and uses structure for integer exponents only. Converts radical notation to rational exponent notation.	Uses proper notation for radicals in terms of rational exponents, but is unable to explain the meaning. Identifies equivalent forms of expressions involving rational exponents (but is not able to re- write or find the product of multiple radical expressions).	Explains and uses the meaning of rational exponents in terms of properties of integer exponents, and uses proper notation for radicals in terms of rational exponents. Rewrites expressions involving radicals and rational exponents, using the properties of exponents; identifies equivalent forms of expressions involving rational exponents; and converts radical notation to rational exponent notation.	Proves, uses, and explains the properties of rational exponents (which are an extension of the properties of integer exponents), and extends to real world context. Compares contexts where radical form is preferable to rational exponents, and vice versa.
Detailed	N-CN.A [1 to 2]	Recognizes that the square root of a negative number is not a real number. Adds, subtracts, and multiplies using single operations with complex numbers (e.g.: 4i + 5i =9i).	Converts simple "perfect" squares to complex number form (bi) , such as the square root of -25 is 5i. Uses the Commutative, Associative, and Distributive properties to	Knows that there is a complex number i such that i^2=-1 , and identifies the proper a+bi form (with a and b real). Calculates sums and products of complex numbers for	Generalizes or develops a rule that explains complex numbers and their properties. Generalizes or develops rules for abstract problems, such as explaining what type of

			identify products and sums of complex numbers.	multi-step problems.	expression results, when given (a + bi)(c + di).
Algebra					
Detailed	A-SSE.A [2]; A-SSE.B [3c]	Identifies structure used to rewrite polynomial expressions.	Identifies structure used to rewrite rational, polynomial, and exponential expressions with rational or real exponents.	Recognizes equivalent forms of complicated expressions, particularly those involving rational, polynomial, or exponential functions with rational or real exponents, and uses the structure of the expression to identify ways to rewrite it.	Rewrites complicated expressions (including those involving rational, polynomial, or exponential functions with rational or real exponents) to equivalent forms using the structure of the expression. Makes generalizations by rewriting expressions in context using their structure.
Detailed	A-SSE.B [4]; F-BF.A [2]	Recognizes if a sequence is arithmetic, geometric, or neither.	Writes arithmetic and/or geometric sequences with an explicit formula.	Writes arithmetic and geometric sequences both recursively and with an explicit formula.	Models contextual situations with arithmetic and geometric sequences (as appropriate).
Detailed	A-APR.B [2]	Given a polynomial in factored form, identifies the zeroes of the polynomial.	Divides a polynomial by a factor (x - a).	Using the Remainder Theorem, decides whether (x - a) is factor of a given polynomial.	Explains why (x-a) is a factor of p(x)=0 when p(a)=0.
Detailed	A-APR.B [3]	Identifies the zeroes of a function from a graph.	Uses zeroes to sketch the graph of a function given in factored form.	Factors a polynomial and uses zeroes to sketch a graph of the function.	Identifies zeroes from a graph and uses zeroes to construct the function.

Detailed	A-APR.C [4]	Identifies a polynomial identity.	Justifies a polynomial identity by testing with specific numbers.	Proves polynomial identities and uses them to describe numerical relationships.	Algebraically justifies the validity of polynomial identities. Uses the identity to describe numerical relationships in a given context.
Detailed	A-APR.D [6]	Rewrites simple rational expressions in different forms, such as rewriting a(x)/x in the form q(x) + 0 , where a(x) and q(x) are polynomials.	Rewrites simple rational expressions in different forms, such as rewriting a(x)/x in the form q(x) + r/x , where a(x) and q(x) are polynomials and r is an integer.	Rewrites simple rational expressions in different forms, such as rewriting a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x) and r(x) are polynomials, with the degree of r(x) less than the degree of b(x).	Rewrites simple rational expressions in different forms such as rewriting a(x)/b(x) in the form q(x) + r(x)/b(x) where a(x) , b(x), q(x) and r(x) are polynomials, with the degree of r(x) less than the degree of b(x) , and b(x) with degree 2 or above.
Detailed	A-CED.A [1]	Identifies exponential equation with integer exponents that models a given situation.	Identifies exponential equation with rational or real exponents and rational functions that models a given situation.	Creates a rational or exponential equation with rational or real exponents and uses it to solve problems.	Explains the meaning of solutions (including extraneous), in reference to context.
Detailed	A-REI.A [1]	Solves simple rational or radical equations with multiple steps, without justifying the steps involved in solving.	Describes the steps in solving simple rational or radical equations.	Explains and justifies the steps in solving simple rational or radical equations by applying the properties of equality, inverse, and identity.	Explains and justifies the steps in solving simple rational and radical equations by applying naming properties.
Detailed	A-REI.A [2]	Identifies simple rational	Identifies the number of	Solves simple rational	Solves complicated

		and radical equations.	solutions and extraneous solutions, given a simple rational or radical equation.	and radical equations and identifies extraneous solutions.	rational and radical equations and justifies extraneous solutions.
Detailed	A-REI.B [4b]; N-CN.C [7]	Solves quadratic equations by simple inspection. Understands the meaning of a complex number.	Solves quadratic equations by factoring. Understands the meaning of a complex number and identifies when quadratic equations will have non-real solutions (but is unable to identify the complex solution).	Solves quadratic equations by inspection (e.g., for x^2 = 49)-- taking square roots, completing the square, the quadratic formula, and factoring-- as appropriate to the initial form of the equation. In the case of equations that have roots with nonzero imaginary parts, writes the solutions as a ± bi for real numbers a and b.	Determines the most efficient method for solving a quadratic equation and justifies the choice selected. Creates a quadratic function without x -intercepts, and verifies that the solutions are complex.
Detailed	A-REI.C [6 to 7]	Identifies by inspection the number of solutions for a system of equations.	Finds approximate solutions of a system of equations from a graph.	Solves a simple system of equations algebraically and graphically.	Generalizes the number of solutions to a system of equations.
Detailed	A-REI.D [11]	Finds the solution to f(x)=g(x), where f(x) and g(x) are linear, and the solution to quadratic functions presented in a graph.	Finds the solution to f(x)=g(x), where f(x) and g(x) are absolute value and exponential functions.	Finds the solution to f(x)=g(x), where f(x) and g(x) are polynomial, rational, radical, absolute value, exponential, or logarithmic functions presented in different forms. Justifies why the x -coordinates of the	Interprets solutions to f(x)=g(x), where f(x) and g(x) are polynomial, rational, radical, absolute value, exponential, or logarithmic functions presented in different forms, in reference to context.

				points of intersection are solutions to the equation f(x)=g(x).	
Functions					
Detailed	F-IF.B [4 to 5]; F-IF.C [9]	Interprets key features of graphs and tables that model a linear function. Sketches graphs showing key features, given a verbal description of a linear relationship.	Interprets key features of graphs and tables that model a quadratic function. Sketches graphs showing key features, given a verbal description of a quadratic relationship.	Interprets key features of graphs and tables that model a function that is neither linear nor quadratic. Sketches graphs showing key features, given a verbal description of a relationship that is not linear or quadratic.	Interprets complex features of a function modeling a real-world context, given a verbal description.
Detailed	F-IF.B [6]	Calculates and interprets the average rate of change of a simple rational function over a specified interval from a graph of the function.	Calculates and interprets the average rate of change of a polynomial or radical function over a specified interval. Estimates the rate of change from a graph of a function.	Calculates and interprets the average rate of change of a logarithmic or trigonometric function over a specified interval. Estimates the rate of change from a graph.	Compares the average rate of change of two non-linear and non-quadratic functions over a specified interval.
Detailed	F-IF.C [7c and 7e]; F-IF.C [8b]	Graphs quadratic functions and identifies zeroes and describes end behavior. Graphs simple exponential functions and identifies intercepts and end behavior.	Chooses the graph of a polynomial function (degree 3 or higher) that matches given key features. Graphs complex exponential functions and simple logarithmic and trigonometric functions and describes key	Graphs a polynomial function (degree 3 or higher); correctly identifies zeroes and describes end behavior. Graphs any exponential or logarithmic function and describes key features. Graphs trigonometric functions	Identifies additional features (such as multiplicity of zeroes, locations of minimums and maximums, domain and range appropriate to a context, or intervals where the function is increasing or decreasing) for a

			features.	with at most 2 transformations.	polynomial function of degree 3 or higher. Graphs trigonometric functions with 3 or more transformations.
Detailed	F-BF.A [1a to 1b]	Adds a constant to a function or multiplies a function by a constant to model a real-world context.	Applies arithmetic operations to multiple linear or exponential functions to build a new function to model a real-world context.	Combines standard functions using arithmetic operations.	Determines whether combining two functions is appropriate to a context, and performs the correct operations.
Detailed	F-BF.B [3]	For a linear and exponential function, f(x), identifies the effect on the graph of replacing f(x) with f(x) + k, k(f(x)), f(kx), and f(x + k) for specific values of k (both positive and negative). Estimates the value of k given the graphs. Compares two functions of the same kind that differ by a transformation, and identifies the transformation.	For quadratic and logarithmic functions, f(x), identifies the effect on the graph of replacing f(x) with f(x) + k, k(f(x)), f(kx), and f(x + k) for specific values of k (both positive and negative). Estimates the value of k given the graphs. Compares two functions of the same kind that differ by a transformation, and identifies the transformation.	For any function, f(x), identifies the effect on the graph of replacing f(x) with f(x) + k, k(f(x)), f(kx, and f(x + k) for specific values of k (both positive and negative). Estimates the value of k given the graphs. Compares two functions of the same kind that differ by a transformation, and identifies the transformation.	Recognizes even and odd functions from their graphs and algebraic expressions.
Detailed	F-BF.B [4a]	Finds inverse functions for linear functions. Identifies whether a function has an inverse from its graph.	Identifies whether a function has an inverse from any representation.	Finds the inverse function for a simple non-linear function, if it exists.	Restricts the domain of a function in order to find its inverse.

Detailed	F-IF.A [3]; F-LE.A [2]	Identifies the parts of a recursive function or sequence.	Defines and expresses a recursive sequence as a function, constructs a linear function (multi-step) given a graph, a description of a relationship, or two input-output pairs.	Recognizes that sequences are functions. Recognizes that a sequence has a domain, which is the subset of integers, and can generate a sequence given a recursive function, constructs a linear function (multi-step) given a graph, a description of a relationship, or two input-output pairs.	Applies the ideas of sequences being functions to real world contexts.
Detailed	F-LE.A [4]	Evaluates a logarithm using technology.	Expresses a logarithmic expression (with no variables) in equivalent exponential form.	Expresses the solution to ab^(ct)=d as a logarithm (where b is 2, 10, or e). Evaluates a logarithm using technology.	Applies logarithms to solve for variables in exponents for contextual problems (such as continuous interest or uninhibited growth/decay).
Detailed	F-TF.A [1]	Knows that a full rotation of a circle is 2π radians.	Locates a radian measure between 0 and 2π on a unit circle.	Locates any radian measure on a unit circle.	Explains that the radian measure of an angle is equivalent to the length of the arc on the unit circle subtended by the angle.
Detailed	F-TF.A [2]	Identifies the sine and cosine of angles in the first quadrant of a unit circle. Recognizes that the coordinates of any	Identifies the sine and cosine of angles on the unit circle.	Explains that one can travel around the unit circle any real number of units and arrive at a set of coordinates that	Explains that one can travel around any circle any real number of units and arrive at a set of coordinates that

		point on the unit circle may be defined as (cos θ, sin θ).		defines trigonometric functions for all real numbers.	defines trigonometric functions for all real numbers.
Detailed	F-TF.B [5]	Identifies the amplitude, frequency, and midline of a given trigonometric function.	Writes a trigonometric function (given a specific amplitude, frequency, and midline).	Writes an appropriate trigonometric function to model a real-world context (where the information about amplitude, frequency, and midline are given clearly).	Analyzes a real-world context to determine which information can be used to write a trigonometric function. Uses this analysis to model the context with a trigonometric function.
Detailed	F-TF.C [8]	Shows that the Pythagorean Identity is valid, given numerical values for the identity.	Finds an unknown trigonometric value by using the Pythagorean Identity.	Proves the Pythagorean Identity sin^2x+cos^2x= , and uses it to find basic trig values, given one trig value and the quadrant.	Extends the Pythagorean Identity to prove that trig ratios are constant for similar triangles.
Geometry					
Detailed	G-GPE.A [2]	Identifies the directrix and focus of a parabola when given its graph.	Identifies the directrix and focus of a parabola when given the equation.	Derives the equation of a parabola, given a focus and directrix.	Justifies conditions for when a point is or is not part of a parabola, given information about the focus and directrix.
Statistics					
Detailed	S-ID.A [4]	Labels a blank normal distribution curve with the appropriate mean and standard deviations.	Uses the Empirical Rule to label a blank normal distribution curve with the appropriate percentages (68%-95%-99.7%).	Uses the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages using the	Additionally, recognizes that there are data sets for which such a procedure is not appropriate. Uses technology or tables to

				Empirical Rule.	estimate areas under the normal curve.
Detailed	S-ID.B [6a]	Creates a scatter plot of bivariate data.	Determines if a plotted data set is approximately linear.	Creates a scatter plot of bivariate data and estimates an exponential (with domains not in the integers) or trigonometric function that fits the data. Uses this function to solve problems in the context of the data.	Compares the fit of different functions to data and determines which function has the best fit.
Detailed	S-IC.A [1]	Describes why a particular sample is not representative.	Describes why a particular sample is not random. Determines what inferences can be made about a population from a given representative random sample.	Explains why a representative random sample is appropriate to make inferences about a population. Explains how a sample may be random, but not representative of the underlying population, or how a sample may be representative, but not random.	Explains how to select a representative random sample from a particular population.
Detailed	S-IC.A [2]	Given two results, decides which is more consistent with a specific data-generating process.	Explains why a specific model is not consistent with given data-generated results.	Decides if a specified model is consistent with results from a given data-generating process, such as a simulation.	Designs a data-generating process (e.g., simulation) to evaluate whether a specified model is consistent with given results.

Detailed	S-IC.B [3]	Identifies whether random sampling was used in a particular study.	Matches a given study to its category: survey, observational study, or experiment.	Explains the differences among sample surveys, experiments, and observational studies. Explains how randomization relates to each type of study.	Explains the purposes and limitations of sample surveys, experiments, and observational studies. Designs an appropriate study for a given situation.
Detailed	S-IC.B [4]	Chooses an interval that represents possible population proportions or means, for a particular sample proportion or mean.	Interprets whether a particular proportion is possible, given a sample proportion or mean in context and a margin of error.	Uses +/-2 standard deviations from a sample proportion or mean to create an interval that can be used to estimate possible population proportion or mean.	Develops a margin of error for a given survey through use of a simulation model.
Detailed	S-IC.B [5]	Determines if the differences between two treatments are typically positive, negative, or centered about zero, given results of a randomized experiment comparing the treatments.	Calculates statistics related to a randomized experiment using two treatments.	Compares the results of a randomized experiment using two treatments to simulations in order to determine if differences in the treatments are significant.	Designs and runs a simulation to build a distribution for possible differences, for a given experiment.
Detailed	S-IC.B [6]	Determines the question being investigated and the groups that were considered, given a report based on data.	Determines the way randomization was used in the design and the results, given a report based on data.	Evaluates the reasonableness of a report based on data.	Interprets the consequences of the results, given a report based on data, and discusses the statistical validity of the findings.
Detailed	S-CP.A [1]	Identifies an event as a	Identifies or shows	Describes events as	Using complex

		subset of a set of outcomes (a sample space).	relationships between sets of events, using Venn diagrams.	subsets of sample space using characteristics of the outcomes, or using appropriate set language and appropriate set representations (unions, intersections, or complements).	representations, makes sense of outcomes in context. (For example: unions of all subsets would equal the sample space).
Detailed	S-CP.A [2]	Calculates probabilities for events (including joint probabilities).	Identifies whether events are independent or dependent.	Understands that two events, A and B , are independent, if the probability of A and B occurring together is the product of their probabilities, and uses this characterization to determine if they are independent.	Contrasts several events in a sample space and determines if they are independent by calculating the event probabilities.
Detailed	S-CP.A [3]	Understands conditional probability and how it applies to real life events.	Calculates conditional probabilities.	Determines the independence of A and B using conditional probabilities.	Identifies and interprets independence of events in contextual problems, using conditional probabilities.
Detailed	S-CP.A [4]	Constructs two-way frequency tables of data.	Approximates conditional probabilities using two-way frequency tables.	Interprets two-way frequency tables of data and uses them to decide if events are independent.	Constructs, interprets, and finds missing values of a two-way frequency table.
Detailed	S-CP.A [5]	Expresses conditional probabilities and	Interprets conditional probabilities and	Recognizes and explains the concepts of	Using concepts of conditional probability

		independence using probability notation.	independence in context.	conditional probability and independence, in everyday language and everyday situations.	and independence, extrapolates the meaning behind probabilities that were calculated from real-world context.
Detailed	S-CP.B [6]	Distinguishes between compound and conditional probability scenarios.	Finds the conditional probability of A, given B as the fraction of B's outcomes that also belong to A, using a two-way table, Venn diagram, or tree diagram.	Interprets conditional probability in terms of a uniform probability model.	Compares and contrasts conditional probabilities and compound probabilities. (For example: from a table, determines the probability of getting the flu, and then compares that to the probability of getting the flu given the individual never washes their hands).
Detailed	S-CP.B [7]	Recalls the Addition Rule.	Applies the Addition Rule, P(A or B) = P(A) + P(B) - P(A and B) to calculate a probability, in a given context.	Applies the general Addition Rule to a uniform probability model, and interprets the answer in terms of the model.	Applies the Addition Rule to different representations of probability models (Venn diagram, tree diagram, and two-way tables), and interprets the answer in an abstract or real-world context.